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IV

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/843,783	04/30/2001	Basanth Jagannathan	FIS920010024US1	1078

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INTERNATIONAL BUSINESS MACHINES CORPORATION
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EXAMINER	
COLEMAN, WILLIAM D	
ART UNIT	**PAPER NUMBER**
2823	

DATE MAILED: 08/18/2003 .

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/843,783	JAGANNATHAN ET AL.	
	Examiner	Art Unit	
	W. David Coleman	2823	

-- Th MAILING DATE of this communication appears on the cover she t with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) *10-14* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 15-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Arguments

Applicant's arguments filed July 7, 2003 have been fully considered but they are not persuasive.

Applicants traverse the rejection of claims 1-9 and 15 under 35 U.S.C. § 103(a) herein known as Czubatyj in view of Furukawa because Applicants believe that the term "precursor" has a different meaning in the prior art reference. Applicants further contend that the Czubatyj is only limited to column 4, lines 36-40.

In response to Applicants contention that only part of a reference is limited to Applicants invention, Czubatyj teaches supplying silane which is equivalent to Applicants silicon precursor and therefore Applicants arguments are moot.

Applicant contend that the combination of Czubatyj and Furukawa is improper because the secondary reference (Furukawa) is silent as to "carbon or boron-doping while supplying a silicon precursor".

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the invention is directed to the changes in doping concentration in a semiconductor device.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-9 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Czubatyj et al., U.S. Patent 5,180,690 in view of Furukawa et al., U.S. Patent 4,885,614.

3. Pertaining to claims 1 and 15, Czubatyj discloses a semiconductor process substantially as claimed. Czubatyj teaches Applicants disclosure. Czubatyj discloses a semiconductor process as claimed. Czubatyj teaches a method of reducing film growth rate when growing a carbon-or boron-doped silicon film or silicon-germanium film comprising:

carbon or boron-doping while supplying a silicon precursor (column 11, line 16) and (column 4, line 40) to a substrate, at reduced pressure of about 0.1 to 100 millitor (column 11, line 23), at a temperature of below about 800^0C. (column 5, line 35), wherein said step of doping while supplying includes supplying a dopant precursor from a single source to the substrate. However, Czubatyj does not specifically disclose lowering the flow rate of the silicon precursor, whereby a concentration of the dopant in the substrate increases.

Furukawa teaches a doping concentration as disclosed in Applicants (FIG. 2), i.e., 10^{19} cm^3(column 4, line 41). In view of Furukawa, it would have been obvious to one of ordinary skill in the art to incorporate the doping concentrations of Furukawa into the Czubatyj semiconductor process because the process will exhibit a high current gain transistor (column 4, lines 61-63).

4. Pertaining to claim 2, Czubatyj teaches wherein supplying germanium precursor to the substrate (column 3, line 53).

5. Pertaining to claim 4, Czubatyj teaches wherein the doping is at a temperature of less than 8000C (column 7, lines 22-25).

6. Pertaining to claim 5, 6 and 7, Czubatyj discloses a semiconductor process substantially as claimed as discussed above. However, Czubatyj fails to disclose wherein the dopant is carbon and wherein the carbon doping is by a carbon precursor supply that is a single source. Furukawa teaches a single source carbon doping gas (Example 6). In view of Furukawa, it would have been obvious to one of ordinary skill in the art to incorporate a single source carbon doping gas into the Czubatyj semiconductor process because the process forms a doped silicon-germanium-carbon layer simultaneously (column 9, lines 45-49).

7. Pertaining to claims 3, 8, 9, 16 and 17 the combined teaches fail to disclose the ranges as claimed for the process of reducing film growth rate when growing carbon or boron-doped silicon film or silicon-germanium film. Given the teaching of the references, it would have been obvious to determine the optimum thickness, temperature as well as condition of delivery of the layers involved. See *In re Aller, Lacey and Hall* (10 USPQ 233-237) "It is not inventive to discover optimum or workable ranges by routine experimentation. Note that the specification contains no disclosure of either the critical nature of the claimed ranges or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 f.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Any differences in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)

Appellants have the burden of explaining the data in any declaration they proffer as evidence of non-obviousness. *Ex parte Ishizaka*, 24 USPQ2d 1621, 1624 (Bd. Pat. App. & Inter. 1992).

An Affidavit or declaration under 37 CFR 1.132 must compare the claimed subject matter with the closest prior art to be effective to rebut a prima facie case of obviousness. *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979).

Conclusion

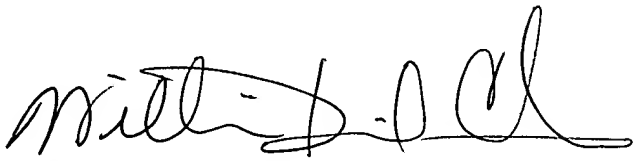
8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

9. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 703-305-0004. The examiner can normally be reached on 9:00 AM-5:00 PM.

11. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

12. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



W. David Coleman
Primary Examiner
Art Unit 2823

WDC